Audiovisual Analytics Vocabulary And Ontology (AAVO): initial core and example expansion

Renato Fabbri, Maria Cristina Ferreira de Oliveira
University of São Paulo, Institute of Mathematical and Computer Sciences, renato.fabbri@gmail.com

Motivation

A linked data vocabulary and ontology of (audio)visual analytics is useful for:

- Making automated inferences about the concepts and objects to which they relate
- Relating objects (e.g. data and techniques) within the field or between the field and other domains
- Expressing a domain knowledge against which queries might be performed
- Expressing a concise overview of the field
- Facilitating the introduction of the Visual Analytics subject to non-specialists

Methods

Conceptualization gathering:

- Second author (specialist) interviewed by the first author (ontologist)
- Studying the literature:
  - Books [1-4];
  - Articles;
  - MOOCs

Formalization of the conceptualization:

- Linked data basics [5]:
  - RDF (expressions in “subject-predicate-object”)
  - SKOS (standard for vocabularies)
  - OWL (standard for ontologies)
- Advanced techniques [6]:
  - Mappings between SKOS and OWL
  - Non-standard triples to express potential relations

Example of triples:

```
<http://example.org/people/mary>
        <http://example.org/properties/name>
                                        "Mary Shastacian"
<http://example.org/people/mary>
        <http://example.org/properties/age>
                                                "57" .
<http://example.org/people/mary>
         <http://example.org/properties/likes>
                  <http://example.org/concepts/Reading>
```

Results

AAVO Core (A)

AAVO Extended (B)

Vocabulary annotations. E.g.:

- in a dataset, an element is also called: an item, an observation, an individual, a point, and even a data point and a data row
- A graph node is also called: a vertex, and every name that are used to designate an element
- A graph edge is also called: a link, a bond, a line, and a connection
- Z-scores are also called: standard scores, normal scores, standardized variables, and z-values

Conclusions and Further Work

AAVO also holds relations that are not explicitly in the literature because of the linked data design.

Potential next steps:

- the inclusion of the concepts Hypothesis, Analysis, and Task into the AAVO core
- Realizing AAVO expansions until the reached concepts can be linked to other ontologies that are sound, used and maintained
- Using AAVO to obtain interesting relations by means of automated inference and to assist a (audio)visual analytics software

Bibliography

[1-4] Data visualization books by Ware (2012), Ward (2010), Telea (2007) and Munzner (2014).

[5] W3C Recommendations.

[6] Fabbri, R. “Enhancements Of Linked Data Expressiveness For Ontologies.” ENMC, 2017.